

Extra Practice and Review

Exponential and Logarithmic Functions

Write the following logarithmic expressions in exponential form.

1) $\log_8 1 = 0$ 2) $\log 100 = 2$ 3) $\ln a = y$

Write the following exponential expressions in logarithmic form.

4) $3^5 = 243$ 5) $e^x = 5$ 6) $7^a = \frac{1}{49}$

Simplify

7) $f \cdot f^6$ 8) $\frac{7y^3}{y^5}$ 9) $(3h^6)^2$

10) Rewrite x^{-4} with a positive exponent.

11) A rabbit population begins growing at a rate of 4% each year. There were 200 rabbits initially. How many will there be at the end of 3 years?

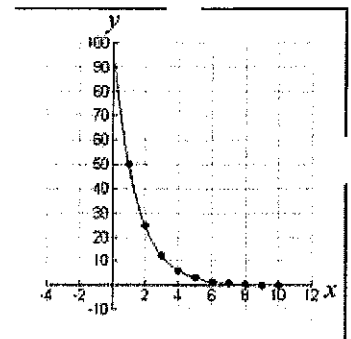
12) An investment worth \$10,250 depreciates 7% every 6 months. Write an equation, $v(m)$, to model the amount of money left in the account after m months.

Classify the following as growth or decay.

13) $y = -0.5(6)^x$ 14) $f(x) = 2\left(\frac{1}{7}\right)^x$ 15)

x	y
0	5
1	15
2	45

 16)



17) Someone puts $\log_7(x - 6) = 0$. Write out this logarithm in exponential form, then solve the equation.

18) Using logarithm rules, write each expression as a single logarithm:

A. $\log 7 + \log y =$ B. $\log x - \log 14 =$ C. $4 \cdot \log 3$

Solve for x .

19) $3^{5x-1} = 27$ 20) $12^{-x+8} = 1$ 21) $5^{4x+1} = 5^{x-3}$ 22) $4^{5x} = 8^{x+2}$

23) Every 15 minutes, half of my 5,000 initial bacteria die off. How many bacteria will be left after 1 hour?

24) The state of Michigan is gathering data on the wolf population. At the first census, there are 3,200 wolves in the state. After the next census 2 years later, the number of wolves decreased to 1,500 wolves. Write an equation that models the wolf population (p) based on the number of years (x) that have passed.

25) The EPA now requires that factories reduce their waste output by 13% each year from the preceding year. If a company is currently producing 7,000 pounds of waste in the year prior to starting the program, write a formula, $f(n)$, that represents their waste output during year n of the program.

26) A car valued at \$22,500 today is depreciating in value exponentially at a rate of 7% each year. Write an expression to represent the expected value of the car in 5 years.

27) If you're given a \$2 allowance when you turn 6 years old and the allowance increases by 5% each year, how much allowance will you receive when you are 14 years old?

Write the exponential equation to fit the table:

28)

x	y
-1	$8/3$
0	8
1	24
2	72

Write the exponential equation to fit each pair of points.

29) Through $(0, 7)$ and $(1, 28)$

30) Through $(1, 9)$ and $(2, 18)$

31) Through $(0, 4)$ and $(4, 44)$

ANSWERS FOR EXTRA PRACTICE AND REVIEW - EXPONENTIALS AND LOGS

(NOTE: These answers are NOT given in order based on problem number)

$\log_3 243 = 5$	Decay	$\log 7y$	f^7
$9h^{12}$	225	$p(x) = 3,200(0.685)^x$	$x = 7$
$v(t) = 10,250(0.93)^{\frac{t}{6}}$	$x = -\frac{4}{3}$	$8^0 = 1$	$y = 8(3)^x$
312 or 313	$\log_7 \frac{1}{49} = a$	$y = 22,500(0.93)^5$	Growth
$10^2 = 100$	$p(t) = 7,000(0.87)^t$	$\frac{7}{y^2}$	$x = \frac{6}{7}$
Decay	$x = \frac{4}{5}$	\$2.95	$e^u = a$
$\log 3^4$	$\ln 5 = x$	Growth	$\log \frac{x}{14}$
$\frac{1}{x^4}$	$y = 7(4)^x$	$y = 4.5(2)^x$	$x = 8$

$$y = 4(1.821)^x$$